



## Cutoff Lows' frequency and large-scale climate modes in the Southern Hemisphere

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The identification of cutoff lows (CoLs) was established from NCEP-DOE II Reanalysis data considering mean daily geopotential height and air temperature at 500 hPa, over the period 1979-2008 (30 years). An automated scheme has been developed to identify CoLs. After having established the trajectories of extra-tropical closed lows at the 500 hPa level, the lows that reached the stage of cutoff during at least one day were extracted. In this study, the CoL stage is defined as a mid-tropospheric closed cold-cored low featuring an equivalent barotropic structure and situated on the equator side of the jet stream.

During the period 1979-2008, it was found that 4830 lows reached the stage of CoL for at least one day in the Southern Hemisphere ( $\sim 161$  per year). Their total lifetime is about 4 days, and the cutoff stage lasts around 2 days on average. The geographic distribution shows that they are more frequent in the zonal band stretching between  $20^{\circ}$ S and  $45^{\circ}$ S and around the continents and these characteristics are consistent with previous studies. On the seasonal time scale, CoLs in the median domain ( $\sim 32.5^{\circ}$ S) are more frequent during transitional seasons (Autumn and Spring) and are linked with the Semi-Annual Oscillation. CoLs are more frequent when the pressure / temperature meridional gradient is reduced between tropical and mid- latitudes and reinforced between mid and high latitudes. On inter-annual time scales, CoL frequency is related to El Niño Southern Oscillation with more systems during La Niña than during El Niño events. This feature is more evident in lower latitudes (between  $17.5^{\circ}$ S- $30^{\circ}$ S) of the Australia, South Pacific and South America sectors.